

09/857534

JUN 6 2001

Practitioner's Docket No. U013501-7

Optional Customer No. Bar Code



00140

PATENT TRADEMARK OFFICE

CHAPTER II

TRANSMITTAL LETTER  
TO THE UNITED STATES ELECTED OFFICE (EO/US)

(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)

PCT/GB99/03821	16 NOVEMBER 1999	11 DECEMBER 1998
INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
BODY SCANNING EQUIPMENT		
TITLE OF INVENTION		

1. ROBERT BRASH
2. TIMOTHY TANNER

APPLICANT(S)

Box PCT  
Assistant Commissioner for Patents  
Washington D.C. 20231  
ATTENTION: EO/US

NOTE: The completion of those filing requirements that can be made at a time later than 30 months from the priority date results from the Commissioner exercising his judgment under the authority granted under 35 USC 371(d). The filing receipt will show the actual date of receipt of the last item completing the entry into the national phase. See 37 C.F.R.

CERTIFICATION UNDER 37 C.F.R. 1.10\*  
(Express Mail label number is **mandatory**.)  
(Express Mail certification is **optional**.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date June 6, 2001, in an envelope as "Express Mail Post Office to Addressee," Mailing Label Number EL728213305US, addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

IBIS CARRILLO  
(type or print name of person mailing paper)  
  
Signature of person mailing paper

**WARNING:** Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

**\*WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing 37 C.F.R. 1.10(b).  
"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442

00857534-13-18

§1 491 which states: "An international application enters the national state when the applicant has filed the documents and fees required by 35 USC 371(c) within the periods set forth in § 1.494 and § 1.495."

**WARNING:** Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. §1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing - See 37 C.F.R. §1.8

**NOTE:** Documents and fees must be clearly identified as a submission to enter the national state under 35 USC 371 otherwise the submission will be considered as being made under 35 USC 111. 37 C.F.R. § 1.494(f).

1. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. 371:
  - a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. 371(f)).
  - b. ☒ The U.S. National Fee (35 U.S.C. 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

0957534-5860

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JG18 Resubmittals 06 JUN 2001

## 2.Fees

CLAIMS FEE	(1) FOR	(2) NUMBER FILED	(3) NUMBER EXTRA	(4) RATE	(5) CALCULATIONS
[ ]*	TOTAL CLAIMS	9 - 20 =		x \$ 18.00 =	\$
	INDEPENDENT CLAIMS	3 - 3 =		x \$ 80.00 =	
	MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$270.00				
BASIC FEE**	<input type="checkbox"/> U.S. PTO WAS INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where an International preliminary examination fee as set forth in § 1.482 has been paid on the international application to the U.S. PTO: <input type="checkbox"/> and the international preliminary examination report states that the criteria of novelty, inventive step (non-obviousness) and industrial activity, as defined in PCT Article 33(2) to (4) have been satisfied for all the claims presented in the application entering the national stage (37 CFR 1.492(a)(4)) ..... \$100.00 <input type="checkbox"/> and the above requirements are not met (37 CFR 1.492(a)(1)) ..... \$690.00				
	<input checked="" type="checkbox"/> U.S. PTO WAS NOT INTERNATIONAL PRELIMINARY EXAMINATION AUTHORITY Where no international preliminary examination fee as set forth in § 1.482 has been paid to the U.S. PTO, and payment of an international search fee as set forth in § 1.445(a)(2) to the U.S. PTO: <input type="checkbox"/> has been paid (37 CFR 1.492(a)(2)) ..... \$710.00 <input type="checkbox"/> has not been paid (37 CFR 1.492(a)(3)) ..... \$1,000.00 <input checked="" type="checkbox"/> where a search report on the international application has been prepared by the European Patent Office or the Japanese Patent Office (37 CFR 1.492(a)(5)) ..... \$860.00				
	Total of above Calculations				860.00
SMALL ENTITY	Reduction by 1/2 for filing by small entity, if applicable. Statement may also be filed. (note 37 CFR 1.9, 1.27, 1.28)				-
	Subtotal				860.00
	Total National Fee				\$860.00
	Fee for recording the enclosed assignment document \$40 00 (37 CFR 1.21(h)). (See Item 13 below). See attached "ASSIGNMENT COVER SHEET".				
TOTAL	Total Fees enclosed				\$860.00

\*See attached Preliminary Amendment Reducing the Number of Claims.

- (Transmittal Letter to the United States Elected Office (EO/US)—page 4 of 8) 13-18

06 JUN 2001

10. ☒ An oath or declaration of the inventor (35 U.S.C. 371(c)(4)) complying with 35 U.S.C. 115
- a. ☐ was previously submitted by applicant on \_\_\_\_\_.  
Date
- b. ☐ is submitted herewith, and such oath or declaration
- i. ☐ is attached to the application.
- ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. 1.70.
- c. ☒ will follow.

Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
- b. ☐ has been transmitted by the International Bureau.  
Date of mailing (from form PCT/IB/308): \_\_\_\_\_.
- c. ☐ is not required, as the application was searched by the United States International Searching Authority.
- d. ☐ will be transmitted promptly upon request.
- e. ☐ has been submitted by applicant on \_\_\_\_\_.  
Date
12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98:
- a. ☒ is transmitted herewith.  
Also transmitted herewith is/are:  
☒ Form PTO-1449 (PTO/SB/08A and 08B).  
☒ Copies of citations listed.
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. 371(c).
- c. ☐ was previously submitted by applicant on \_\_\_\_\_.  
Date
13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

14. ☒ Additional documents:
- a. ☐ Copy of request (PCT/RO/101)
  - b. ☒ International Publication No. WO 00/36370
    - i. ☒ Specification, claims and drawing
    - ii. ☐ Front page only
  - c. ☐ Preliminary amendment (37 C.F.R. § 1.121)
  - d. ☒ Other

FORM PCT/IPEA/416

15. ☒ The above checked items are being transmitted
- a. ☒ before 30 months from any claimed priority date.
  - b. ☐ after 30 months.
16. ☐ Certain requirements under 35 U.S.C. 371 were previously submitted by the applicant on \_\_\_\_\_, namely:

#### AUTHORIZATION TO CHARGE ADDITIONAL FEES

**WARNING:** *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges if extra claims are authorized.*

**NOTE:** *"A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).*

**NOTE:** *"Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).*

☒ The Commissioner is hereby authorized to charge the following additional fees that may be required by this paper and during the entire pendency of this application to Account No. 12-0425.

☒ 37 C.F.R. 1.492(a)(1), (2), (3), and (4) (filing fees)

**WARNING:** *Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.*

☐ 37 C.F.R. 1.492(b), (c) and (d) (presentation of extra claims)

**NOTE:** *Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must*

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only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

- ☒ 37 C.F.R. 1.17 (application processing fees)  
☒ 37 C.F.R. 1.17(a)(1)-(5)(extension fees pursuant to § 1.136(a).  
☒ 37 C.F.R. 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b)

NOTE: 37 C.F.R. 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application prior to paying, or at the time of paying issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity

- ☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

  
 SIGNATURE OF PRACTITIONER

WILLIAM R. EVANS

(type or print name of practitioner)

Reg. No.: 25,858

Tel. No.: (212) 708-1930

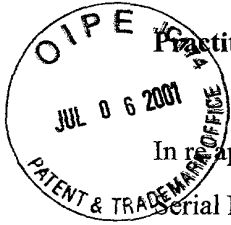
Customer No.: 00140

P.O. Address

 c/o Ladas & Parry  
 26 West 61<sup>st</sup> Street  
 New York, N.Y. 10023

09/857534-00140





Practitioner's Docket No. U 013501-7

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of Robert BRASH, et al

Serial No.: 09/857,534

Group No.:

Filed: June 6, 2001

Examiner:

For: BODY SCANNING EQUIPMENT

Assistant commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT TRANSMITTAL

1. Transmitted herewith is an amendment for this application.

STATUS

2. Applicant is

- ☐ a small entity. A statement:  
☐ is attached.  
☐ was already filed.  
☒ other than a small entity.

CERTIFICATE OF MAILING/TRANSMISSION (37 C.F.R. 1.8(a))

I hereby certify that, on the date shown below, this correspondence is being:

MAILING

- ☒ deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

3  
Date: July 2, 2001

FACSIMILE

- ☐ transmitted by facsimile to the Patent and Trademark Office.

Signature

JULIAN H. COHEN  
(type or print name of person certifying)

## EXTENSION OF TERM

NOTE: "Extension of Time in Patent Cases (Supplement Amendments) — If a timely and complete response has been filed after a Non-Final Office Action, an extension of time is not required to permit filing and/or entry of an additional amendment after expiration of the shortened statutory period.

If a timely response has been filed after a Final Office Action, an extension of time is required to permit filing and/or entry of a Notice of Appeal or filing and/or entry of an additional amendment after expiration of the shortened statutory period unless the timely-filed response placed the application in condition for allowance. Of course, if a Notice of Appeal has been filed within the shortened statutory period, the period has ceased to run." Notice of December 10, 1985 (1061 O.G. 34-35).

NOTE: See 37 C.F.R. 1.645 for extensions of time in interference proceedings, and 37 C.F.R. 1.550(c) for extensions of time in reexamination proceedings.

3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply.

(complete (a) or (b), as applicable)

- (a) ☐ Applicant petitions for an extension of time under 37 C.F.R. 1.136 (fees: 37 C.F.R. 1.17(a)(1)-(4)) for the total number of months checked below:

	Extension (months)	Fee for other than small entity	Fee for small entity
<input type="checkbox"/>	one month	\$ 110.00	\$ 55.00
<input type="checkbox"/>	two months	\$ 390.00	\$ 195.00
<input type="checkbox"/>	three months	\$ 890.00	\$ 445.00
<input type="checkbox"/>	four months	\$ 1,390.00	\$ 695.00

Fee: \$ \_\_\_\_\_

If an additional extension of time is required, please consider this a petition therefor.

(check and complete the next item, if applicable)

- ☐ An extension for \_\_\_\_\_ months has already been secured. The fee paid therefor of \$ \_\_\_\_\_ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$ \_\_\_\_\_

OR

- (b) ☒ Applicant believes that no extension of term is required. However, this is a conditional petition being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

## FEE FOR CLAIMS

4. The fee for claims (37 C.F.R. 1.16(b)-(d)) has been calculated as shown below:

					SMALL ENTITY		OTHER THAN A SMALL ENTITY		
(Col.1)			(Col. 2)	(Col. 3)					
Claims Remaining After Amendment			Highest No. Previously Paid For	Present Extra	Rate	Addit. Fee	OR	Rate	Addit. Fee
Total	*	Minus	**	=	x \$ 9 =	\$		x \$18 =	\$
Indep.	*	Minus	***	=	x \$40 =	\$		x \$80 =	\$
[ ] First Presentation of Multiple Dependent Claim					+ \$135 =	\$		+ \$270 =	\$
					Total Addit. Fee	\$	OR	Total Addit. Fee	\$

- \* If the entry in Col. 1 is less than the entry in Col. 2, write "O" in Col. 3.  
 \*\* If the "Highest No. Previously Paid For" IN THIS SPACE is less than 20, enter "20".  
 \*\*\* If the "Highest No. Previously Paid For" IN THIS SPACE is less than 3, enter "3".  
 The "Highest No. Previously Paid For" (Total or Indep.) is the highest number found in the appropriate box in Col. 1 of a prior amendment or the number of claims originally filed.

**WARNING:** "After final rejection or action (§ 1.113) amendments may be made canceling claims or complying with any requirement of form which has been made." 37 C.F.R. 1.116(a) (emphasis added).

(complete (c) or (d), as applicable)

- (c) ☒ No additional fee for claims is required.

**OR**

- (d) ☐ Total additional fee for claims required \$ \_\_\_\_\_.

## FEE PAYMENT

5. ☐ Attached is a check in the sum of \$ \_\_\_\_\_.  
☐ Charge Account No. 12-0425 the sum of \$ \_\_\_\_\_.  
 A duplicate of this transmittal is attached.

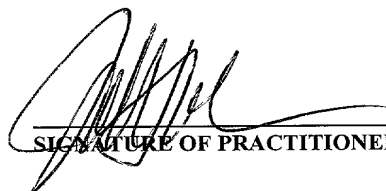
## FEE DEFICIENCY

NOTE: *If there is a fee deficiency and there is no authorization to charge an account, additional fees are necessary to cover the additional time consumed in making up the original deficiency. If the maximum, six-month period has expired before the deficiency is noted and corrected, the application is held abandoned. In those instances where authorization to charge is included, processing delays are encountered in returning the papers to the PTO Finance Branch in order to apply these charges prior to action on the cases. Authorization to charge the deposit account for any fee deficiency should be checked. See the Notice of April 7, 1986, (1065 O.G. 31-33).*

6. ☒ If any additional extension and/or fee is required, charge Account No. 12-0425.

### AND/OR

- ☒ If any additional fee for claims is required, charge Account No. 12-0425

  
\_\_\_\_\_  
SIGNATURE OF PRACTITIONER

JULIAN H. COHEN  
(type or print name of practitioner)

Reg. No. 20,302

Tel. No. 212-708-1887

\_\_\_\_\_  
P.O. Address

Customer No. 00140

\_\_\_\_\_  
c/o Ladas & Parry  
26 West 61 Street  
New York, N.Y. 10023

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Robert A.D. BRASH, et al.

Serial No.: 09/857,534

Group No.: - -

Filed: June 6, 2001

Examiner: - -

For: BODY SCANNING EQUIPMENT

Attorney Docket No.: U 013501-7

Assistant Commissioner for Patents  
Washington, D.C. 20231

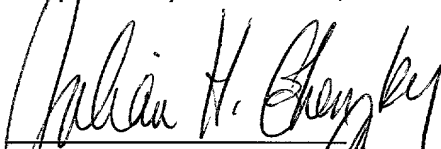
WRITTEN ASSERTION OF SMALL ENTITY STATUS

This is written assertion on the basis of:

- ☐ personal knowledge;
- ☐ applicant's letter of \_\_\_\_\_;
- ☒ applicant's agent's e- mail letter of June 28, 2001; or
- ☐ other \_\_\_\_\_

by a practitioner (not necessarily of record) that the above application is entitled to small entity status and, therefore, fees.

Respectfully submitted,

  
Julian H. Cohen  
c/o Ladas & Parry  
26 West 61<sup>st</sup> Street  
New York, N.Y. 10023  
Reg No 30086

**CERTIFICATION UNDER 37 C.F.R. 1.10\***

(Express Mail label number is **mandatory**.)

(Express Mail certification is optional.)

I hereby certify that this correspondence and the documents referred to as attached therein are being deposited with the United States Postal Service on this date September 10, 2001 in an envelope as "Express Mail Post Office to Addressee", mailing Label Number EL728214861US, addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

CONNIE YANNOTTI

(type or print name of person mailing paper)



Signature of person mailing paper

09857534-004004



10 Received 06 JUL 2001

#7

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Robert BRASH, et al  
Serial No.: 09/857,534                      Group No.:  
Filed: June 6, 2001                      Examiner.:  
For: BODY SCANNING EQUIPMENT

Attorney Docket No.: U 013501-7

Assistant Commissioner for Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Please amend the above application as follows.

IN THE CLAIMS:

5. (Amended)                      An equipment as claimed in claim 3, wherein two pairs of sets of apparatus are provided, each pair being located in a different elevational position with respect to said body so that each pair is able to scan a whole portion of a body and the elevational location of the paris being arranged such that a complete body may be scanned.

CERTIFICATE OF MAILING (37 CFR 1.8a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Assistant Commissioner of Patents and Trademarks, Washington, D.C. 20231

JULIAN H. COHEN

(Type or print name of person mailing paper)

Date: July 2, 2001

(Signature of person mailing paper)

7/3/01  
JHC

6. (Amended) An equipment as claimed in claim 3, wherein said first and second reflectors and said switchable reflector means are each formed by a respective mirror.

7. (Amended) An equipment as claimed in any of claim 3, wherein said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.

Please add the following claims:

--10. (New) An equipment as claimed in claim 4, wherein two pairs of sets of apparatus are provided, each pair being located in a different elevational position with respect to said body so that each pair is able to scan a whole portion of a body and the elevational location of the pairs being arranged such that a complete body may be scanned.--

--11. (New) An equipment as claimed in claim 4, wherein said first and second reflectors and said switchable reflector means are each formed by a respective mirror.--

--12.(New) An equipment as claimed in claim 5, wherein said first and second reflectors and said switchable reflector means are each formed by a respective mirror.--



An equipment as claimed in any of claim 4, wherein said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.--

--14.(New) An equipment as claimed in any of claim 5, wherein said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.--

--15. (New) An equipment as claimed in any of claim 6, wherein said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.--

#### REMARKS

The above amendatory action is taken solely for the purpose of avoiding claim fees that would otherwise accrue due to the presence of multiple dependent claims.

Respectfully submitted,

JULIAN H. COHEN  
LADAS & PARRY  
26 WEST 61ST STREET  
NEW YORK, NEW YORK 10023  
REG. NO. 20,302 (212) 708-1887



MARKED UP COPY

5. (Amended) An equipment as claimed in claim 3 [or 4], wherein two pairs of sets of apparatus are provided, each pair being located in a different elevational position with respect to said body so that each pair is able to scan a whole portion of a body and the elevational location of the paris being arranged such that a complete body may be scanned.

6. (Amended) An equipment as claimed in claim 3 [claims 3, 4 or 5], wherein said first and second relfectors and said switchable reflector means are each formed by a respective mirror.

7. (Amended) An equipment as claimed in claim 3 [any of claims 3 to 6], wherein said sets of apparatus are mounted in a booth, typically aproximately 2 metres square and about 2.4 metres high.

1 put

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WO 00/36370

PCT/GB99/03821  
10 Recd JUN 2001

BODY SCANNING EQUIPMENT

5 This invention relates to body scanning equipment and, in particular, although not exclusively to, a body scanning equipment for use in the garment industry.

10 It is a wish in the garment industry for most, if not all, clothing to be custom made. At present, bespoke tailoring, i.e. custom made garments, are expensive to produce and most garments sold are made in different predetermined sizes and sold ready-to-wear. So as to satisfy the need for custom manufacturer garments, there is a need to define a customer's shape so that the garment can be manufactured to fit accurately. Measurement of the human body using a conventional tailor's tape measure has been shown to be prone to human error and is limited to taking a number of dimensions by time and convenience considerations. An automatic scanner which may quickly provide a large number of accurate measurements would enable custom tailoring to produce a better fit with fewer or no fitting sessions, or alternatively, to match the customer to a wider range of predefined sizes and size variants.

25 Body scanning apparatus is known to produce prosthesis, for example, but such equipment tends to be large in size and extremely costly.

30 So as to be affordable to chain and high street stores, the cost of manufacture of body scanning equipment must be kept to a minimum. Known three-dimensional scanning devices contain expensive components such as good quality cameras and electronics to control the cameras and

produce a three-dimensional image. Each scanning device is limited by its position and field of view as to how much of the body surface the device can capture. Therefore, if a large part of a body surface is required to be captured, then it is necessary to use plural scanning devices spaced around the person being scanned, and the data from each scanning device is joined together to construct the whole, 360°, body surface. While such an arrangement of scanning devices overcomes the problem of capture, it demands a large number of scanning device positions and, hence, leads to a high manufacturing cost.

A further problem is one of the size of a scanning booth in which the scanning devices are located. Typical known scanning devices work best at ranges of about 2 metres from the surface to be scanned. Although, in theory, closer ranges are possible if the capture field of view of the scanning device is reduced, or if very wide optics are used on the scanning device. However, a smaller field of view leads to the requirement of additional scanning devices with consequential greater cost, and wide angle optics give greater distortion and, therefore, lower accuracy, as well as being costly.

The present invention seeks to provide a body scanning equipment which substantially mitigates the foregoing disadvantages.

According to a broadest aspect of this invention there is provided a body scanning equipment including one set of apparatus locate to scan a portion of a body, said set of apparatus comprising scanning means, reflector means associated with said scanning means, said reflector means including first and second reflectors spaced on opposing

sides of said scanning means for directing radiant energy to opposing sides of said body, and switchable reflector means for directing radiant energy alternately between said scanning means and said first and second reflectors whereby substantially a 180° scan of said body may be made.

Such a set of apparatus may be used, for example, in a medical environment where it is desired to scan a face of a person.

Where a prosthesis is required to be made or body scanning equipment for use in the garment industry, for example, then it is preferable that two sets of apparatus be provided.

Accordingly in a feature of this invention there is provided a body scanning equipment including two sets of apparatus located to scan opposing front and rear portions of a body to be scanned and each set of apparatus comprising scanning means, reflector means associated with each scanning means, each said reflector means including first and second reflectors spaced on opposing sides of said scanning means for directing radiant energy to opposing sides of said body, and switchable reflector means for directing radiant energy alternately between said scanning means and said first and second reflectors, whereby a complete 360° scan of said body may be made.

The scanning means may comprising a camera having a viewing axis and an illumination means having an illumination axis which is offset from said camera viewing axis.

Preferably, two pairs of sets of apparatus are provided, each pair being located in a different elevational position with respect to said body so that each pair is able to scan a whole portion of a body and the

elevational location of the pairs being arranged such that a complete body may be scanned.

Conveniently, said first and second reflectors and said switchable reflector means are each formed by a respective mirror.

Advantageously, said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.

Preferably, each scanning means provides an output signal to processor means including means for computing surface data from images received from each opposing side of said body, means for producing aligned data from said surface data, means for producing a signal from said aligned data indicative of the surfaces of said body joined together through 360°, and means for calculating surface measurements derived from said means for producing.

Advantageously, said means for calculating is connected to a numerically controlled garment cutting machine which may in turn be connected to an automated garment assembly apparatus.

The invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 shows a top plan view of an apparatus in accordance with this invention,

Figure 2 shows a side view of the apparatus shown in Figure 1,

Figure 3 shows, in schematic form, a scanning device used in this invention, and

Figure 4 shows a flow diagram of the operation of the invention.

In the Figures like reference numerals denote like parts.

The body scanning equipment shown in Figures 1 and 2 is located within a booth 1 shown in the drawings as two separate halves, although the booth may be a single member having a door. The booth typically has dimensions of approximately 2 metres square and about 2.4 metres in height. Approximately centrally located within the booth is shown a body 2 of a customer to be scanned. The body scanning apparatus includes, in the exemplary embodiment, four sets of apparatus arranged in two pairs. A first pair of sets of apparatus is arranged to scan the top portion of the body 2 and the second pair of sets of apparatus is arranged to scan the lower portion of the body 2.

Each set of a pair of apparatus is arranged to scan either a front or a rear portion of the body 2. Because each set of apparatus is the same as the other sets, the invention will be described in relation to a single set of apparatus.

Each set of apparatus has a scanning device 4 comprising, as shown in Figure 3, a camera 241 having a viewing axis and an illumination device, such as a lamp 242, having an illumination axis which is different from the viewing axis of the camera. The illumination axis of the lamp 242 is, preferably, at a different elevation from the viewing axis of the camera 241, although such is not essential.

A pair of inclined mirrors 5, 6 are attached on each side of the optical axis of the scanning device 4 so as to direct radiant energy to a respective side of the body 2. A pivotable mirror 7 is located in front of the scanning device 4 so as to alternately reflect radiant

energy to a respective one of the mirrors 5 or 6. By pivotally skewing the mirror 7 between two positions, two effective scanner positions are derived from a single scanning device 4. The other set of apparatus on the same elevational level as the scanning device 4 and the mirrors 5, 6 and 7 is denoted by reference numerals 41, 51, 61 and 71 respectively. Scans are made sequentially with the pivotable mirror 7, 71 in each of its two positions so that the complete 360° of a body surface may be scanned with just two scanning devices. A further pair of sets of apparatus are provided elevationally below the above-mentioned pair of sets of apparatus and are denoted by reference numerals 104, 105, 106, 107 and 141, 151, 161 and 171, so that the whole 360° and whole height of the body 2 may be scanned.

The operation of the equipment will now be described with reference to Figure 4.

The lamp 242 of each scanning device projects a pattern of light onto the surface of the body 2. The pattern of light may be obtained by a sequential series of light scans formed of narrow slits of light which are respectively projected onto different elevational locations of the body or, more usually, light is shone through a grating having plural horizontal slits therein. The body is scanned by the camera 241 and the data is processed to obtain three-dimensional surface co-ordinate data. The pattern of light that is projected comprising a series of horizontal lines is deflected by the contours of the surface of the body so that the lines appear bent when viewed at an offset angle by the camera 241. Using a sequence of such line patterns, and applying triangulation

calculations to the amount by which the lines have been deflected up or down at each point on the surface, allows the surface contours to be mapped.

In the course of a scan each of the four scanning devices captures two images, one from each position of the pivotable mirror 4, 41, 104, 141. Thus, at the end of the scanning process a total of eight three-dimensional images are produced which represent eight overlapping sections of the surface of the body 2. Output from the camera of the scanning devices is applied to a processor 100. Using software, the image data from the respective positions of the mirror 7, 71, 104, 141 is computed 101 and the computed surfaces are aligned 102. The aligned surfaces are joined together at step 103 where a three-dimensional representation of the whole body surface is produced. Having obtained the three-dimensional representation of the surface of the body, automated measurements are taken from the surface data at step 104 to be used in much the same way as a tailor on the actual person.

The manner by which the processor operates is described in:

Scanning Moire Method and Automatic Measurement of 3-D Shapes Applied Optics, vol. 16, No. 8. Masanori Idesawa et al. Aug. 1977, and

Moire Topology

Applied Optics, vol.9, No. 6. H. Takasaki June 1970.

It will, thus, be appreciated that the measurements are made more quickly, non-invasively, and with greater accuracy and consistency than can be achieved manually.

The measurements may be supplied as output signals to a garment material cutting machine 111, known per se, and to



a garment assembly unit 112, known per se, so that custom fitted clothing is provided.

The foregoing invention overcomes the problems of cost and size and the invention provides an accurate match in geometric accuracy and colour between pairs of image sections taken with the same scanning device. The invention, by using the novel optical arrangement, reduces the amount of software data processing that is needed to match the sections of image in order to make a seamless, all round, surface.

CLAIMS:

1. A body scanning equipment including one set of apparatus (1) located to scan a portion of a body (2), said set of apparatus comprising scanning means (4), reflector means (5, 6) associated with said scanning means, said reflector means including first and second reflectors spaced on opposing sides of said scanning means for directing radiant energy to opposing sides of said body, and switchable reflector means (7) for directing radiant energy alternately between said scanning means and said first and second reflectors whereby substantially a 180° scan of said body may be made.

2. An equipment as claimed in claim 1, wherein two sets of apparatus are provided.

3. A body scanning equipment including two sets of apparatus (1) located to scan opposing front and rear portions of a body (2) to be scanned and each set of apparatus comprising scanning means (4; 41), reflector means (5, 6; 51, 61) associated with each scanning means, each said reflector means including first and second reflectors spaced on opposing sides of said scanning means for directing radiant energy to opposing sides of said body, and switchable reflector means (7; 71) for directing radiant energy alternately between said scanning means and said first and second reflectors, whereby a complete 360° scan of said body may be made.

4. An equipment as claimed in claim 3, wherein scanning means comprises a camera (241) having a viewing axis and an illumination means (242) having an illumination axis which is offset from said camera viewing axis.

5. An equipment as claimed in claim 3 or 4, wherein two pairs of sets of apparatus are provided, each pair being located in a different elevational position with respect to said body so that each pair is able to scan a whole portion of a body and the elevational location of the pairs being arranged such that a complete body may be scanned.

6. An equipment as claimed in claims 3, 4 or 5, wherein said first and second reflectors and said switchable reflector means are each formed by a respective mirror.

7. An equipment as claimed in any of claims 3 to 6, wherein said sets of apparatus are mounted in a booth, typically approximately 2 metres square and about 2.4 metres high.

8. An equipment as claimed in any preceding claim, wherein each scanning means provides an output signal to processor means (100) including means (101) for computing surface data from images received from each opposing side of said body, means (102) for producing aligned data from said surface data, means (103) for producing a signal from said aligned data indicative of the surfaces of said body joined together through 360°, and means (104) for

calculating surface measurements derived from said means  
for producing.

9. An equipment as claimed in claim 8, wherein said means for calculating is connected to a numerically controlled garment cutting machine (111) which may in turn be connected to an automated garment assembly apparatus (112).

1/2

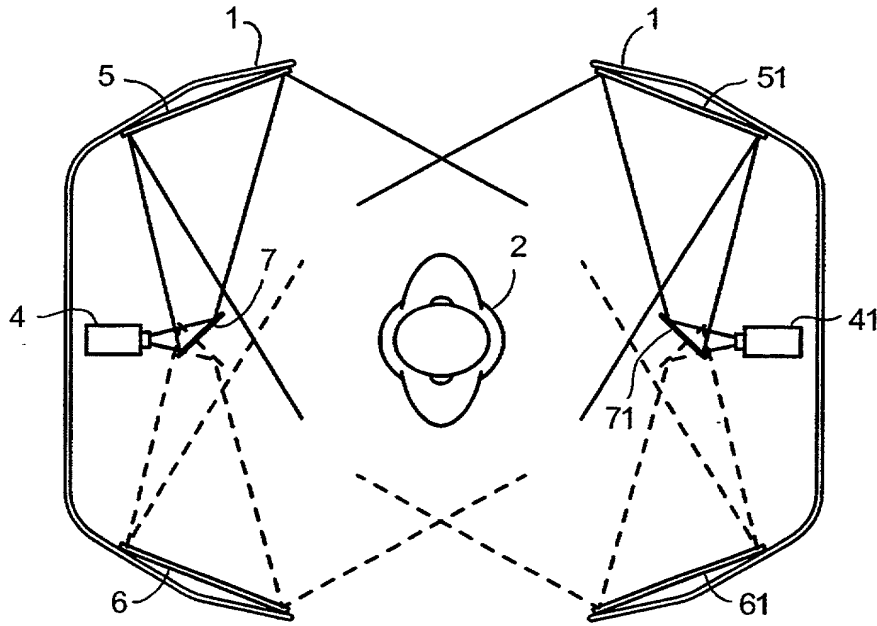


FIG. 1

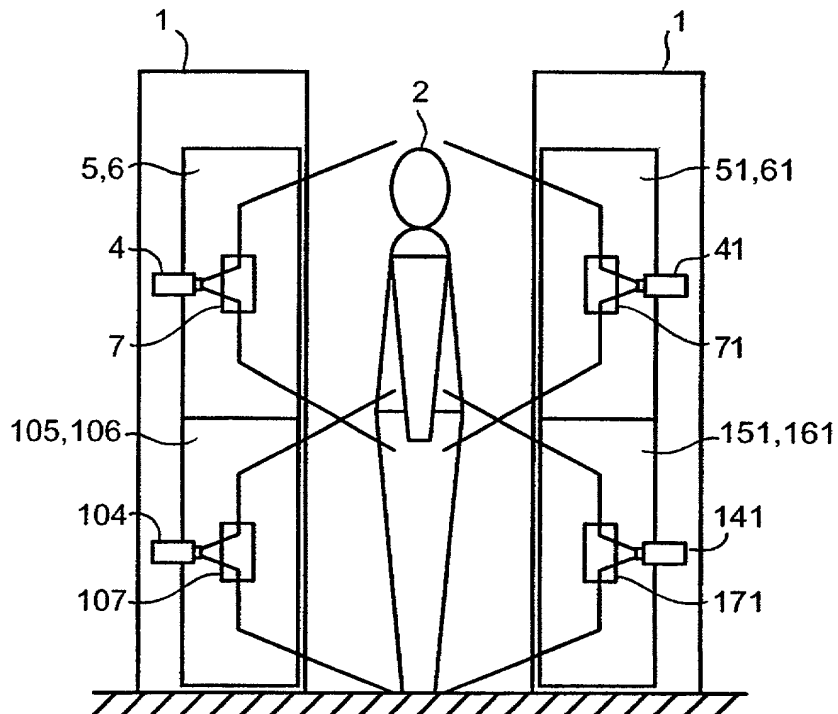


FIG. 2

SUBSTITUTE SHEET (RULE 26)

09/857534 465/5860

2 / 2

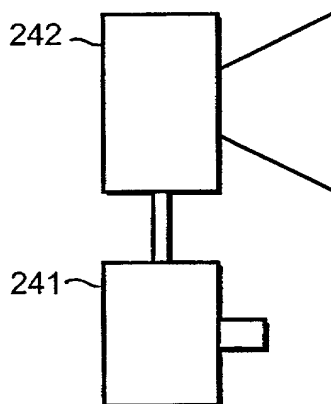


FIG. 3

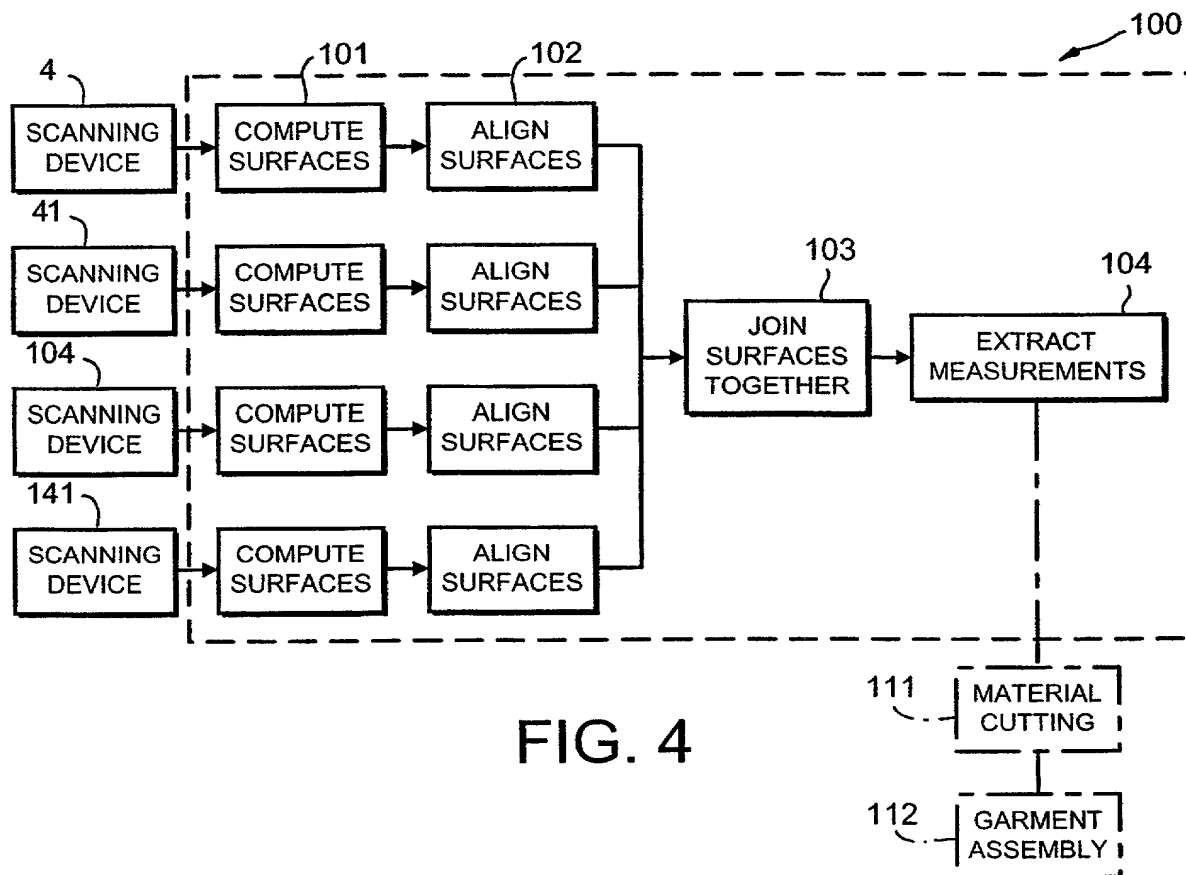


FIG. 4

Optional Customer No. Bar Code →

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COMBINED DECLARATION AND POWER OF ATTORNEY

---

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL,  
CONTINUATION, OR C-I-P)

---

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type:

(check one applicable item below)

- ☐ original.  
☐ design.

NOTE: With the exception of a supplemental oath or declaration submitted in a reissue, a supplemental oath or declaration is not treated as an amendment under 37 CFR 1.312 (Amendments after allowance). M.P.E.P. Section 714.16, 7<sup>th</sup> Ed.

- ☐ supplemental.

NOTE: If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.

- ☒ national stage of PCT.

NOTE: If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.

NOTE: See 37 C.F.R. Section 1.63(d) (continued prosecution application) for use of a prior nonprovisional application declaration in the continuation or divisional application being filed on behalf of the same or fewer of the inventors named in the prior application.

- ☐ divisional.  
☐ continuation.

NOTE: Where an application discloses and claims subject matter not disclosed in the prior application, or a continuation or divisional application names an inventor not named in the prior application, a continuation-in-part application must be filed under 37 C.F.R. Section 1.53(b) (application filing requirements-nonprovisional application)

- ☐ continuation-in-part (C-I-P).

## INVENTORSHIP IDENTIFICATION

**WARNING:** *If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted*

My residence, post office address and citizenship are as stated below, next to my name. I believe that I am the original, first and sole inventor (*if only one name is listed below*) or an original, first and joint inventor (*if plural names are listed below*) of the subject matter that is claimed, and for which a patent is sought on the invention entitled:

## TITLE OF INVENTION

BODY SCANNING EQUIPMENT

## SPECIFICATION IDENTIFICATION

The specification of which:

(complete (a), (b), or (c))

(a) ☐ is attached hereto.

**NOTE:** *"The following combinations of information supplied in an oath or declaration filed on the application filing date with a specification are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

*"(1) name of inventor(s), and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration on filing;*

*"(2) name of inventor(s), and attorney docket number which was on the specification as filed; or*

*"(3) name of inventor(s), and title which was on the specification as filed."*

*Notice of July 13, 1995 (1177 O.G. 60).*

(b) ☐ was filed on \_\_\_\_\_, ☐ as Application No. \_\_\_\_\_  
☐ and was amended on \_\_\_\_\_ (if applicable).

**NOTE:** *Amendments filed after the original papers are deposited with the PTO that contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 C.F.R. Section 1.67.*

**NOTE:** *"The following combinations of information supplied in an oath or declaration filed after the filing date are acceptable as minimums for identifying a specification and compliance with any one of the items below will be accepted as complying with the identification requirement of 37 C.F.R. Section 1.63:*

*(A) application number (consisting of the series code and the serial number, e.g., 08/123,456),*

*(B) serial number and filing date;*

*(C) attorney docket number which was on the specification as filed;*

*(D) title which was on the specification as filed and reference to an attached specification which is both attached to the oath or declaration at the time of execution and submitted with the oath or declaration; or*

*(E) title which was on the specification as filed and accompanied by a cover letter accurately identifying the application for which it was intended by either the application number (consisting of the series code and the serial number, e.g., 08/123,456), or serial number and filing date. Absent any statement(s) to the contrary, it will be presumed that the application filed in the PTO is the application which the inventor(s) executed by signing the oath or declaration.*

*M.P.E.P. Section 601.01(a), 7th ed.*



- (c) ☐ was described and claimed in PCT International Application No. PCT/GB99/03821 filed on 11.16.99 and as amended under PCT Article 19 on \_\_\_\_\_ (if any).

**SUPPLEMENTAL DECLARATION (37 C.F.R. Section 1.67(b))**

*(complete the following where a supplemental declaration is being submitted)*

☐ I hereby declare that the subject matter of the

☐ attached amendment

☐ amendment filed on \_\_\_\_\_.

was part of my/our invention and was invented before the filing date of the original application, above identified, for such invention.

**ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR**

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information, which is material to patentability as defined in 37, Code of Federal Regulations, Section 1.56,

*(also check the following items, if desired)*

☐ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

☐ in compliance with this duty, there is attached an information disclosure statement, in accordance with 37 C.F.R. Section 1.98.

**PRIORITY CLAIM (35 U.S.C. Section 119(a)-(d))**

**NOTE** "The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by Section 1 63. The claim for priority and the certified copy of the foreign application specified in 35 U S C. Section 119(b) must be filed in the case of an interference (Section 1 630), when necessary to overcome the date of a reference relied upon by the examiner, when specifically required by the examiner, and in all other situations, before the patent is granted. If the claim for priority or the certified copy of the foreign application is filed after the date the issue fee is paid, it must be accompanied by a petition requesting entry and by the fee set forth in Section 1.17(i). If the certified copy is not in the English language, a translation need not be filed except in the case of interference, or when necessary to overcome the date of a reference relied upon by the examiner, or when specifically required by the examiner, in which event an English language translation must be filed together with a statement that the translation of the certified copy is accurate." 37 C.F.R. Section 1.55(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

- (d) ☐ no such applications have been filed.  
(e) ☐ such applications have been filed as follows.

**NOTE:** Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.

**PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION  
AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. SECTION 119(a)-(d)**

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING DAY, MONTH, YEAR	PRIORITY CLAIMED UNDER 35 USC 119
GREAT BRITAIN	9827384.0	11 DECEMBER 1998	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)  
(35 U.S.C. Section 119(e))

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S)  
UNDER 35 U.S.C. SECTION 120

[ ] The claim for the benefit of any such applications are set forth in the attached ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR CONTINUATION-IN-PART (C-I-P) APPLICATION.

ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS  
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOTE: If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. Section 120.

POWER OF ATTORNEY

I hereby appoint the following practitioner(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

(list name and registration number)

JOSEPH H. HANDELMAN, 26179

RICHARD P. BERG, 28145

JOHN RICHARDS, 31053

JULIAN H. COHEN, 20302

RICHARD J. STREIT, 25765

WILLIAM R. EVANS, 25858

PETER D. GALLOWAY, 27885

JANET I. CORD, 33778

IAN C. BAILLIE, 24090

CLIFFORD J. MASS, 30086

THOMAS F. PETERSON, 24790

CYNTHIA R. MILLER, 34678

(Check the following item, if applicable)

- ☐ I hereby appoint the practitioner(s) associated with the Customer Number provided below to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.
- ☐ Attached, as part of this declaration and power of attorney, is the authorization of the above-named practitioner(s) to accept and follow instructions from my representative(s).

NOTE: "Special care should be taken in continuation or divisional applications to ensure that any change of correspondence address in a prior application is reflected in the continuation or divisional application. For example, where a copy of the oath or declaration from the prior application is submitted for a continuation or divisional application filed under 37 CFR 1.53(b) and the copy of the oath or declaration from the prior application designates an old correspondence address, the Office may not recognize, in the continuation or divisional application, the change of correspondence address made during the prosecution of the prior application. Applicant is required to identify the change of correspondence address in the continuation or divisional application to ensure that communications from the Office are mailed to the current correspondence address. 37 CFR 1.63(d)(4)." Section 601.03, M.P.E.P., 7th Ed.

SEND CORRESPONDENCE TO

DIRECT TELEPHONE CALLS TO:

(Name and telephone number)

Ladas & Parry  
26 West 61<sup>st</sup> Street  
New York, N.Y. 10023

(complete the following if applicable)

Since this filing is a ☐ continuation ☐ divisional there is attached hereto a Change of Correspondence Address so that there will be no question as to where the PTO should direct all correspondence.

#### DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

## SIGNATURE(S)

NOTE Carefully indicate the family (or last) name, as it should appear on the filing receipt and all other document.

NOTE Each inventor must be identified by full name, including the family name, and at least one given name without abbreviation together with any other given name or initial, and by his/her residence, post office address and country of citizenship 37 C.F.R. Section 1.63(a)(3)

NOTE Inventors may execute separate declarations/oaths provided each declaration/oath sets forth all the inventors. Section 1.63(a)(3) requires that a declaration/oath, inter alia, identify each inventor and prohibits the execution of separate declarations/oaths which each sets forth only the name of the executing inventor. 62 Fed. Reg. 53,131, 53,142, October 10, 1997,

### Full name of sole or first inventor

100-4525860

ROBERT  
(Given Name)

ALAN, D.  
(Middle Initial or Name)

BRASH  
Family (Or Last Name)

Inventor's signature [Signature]

Date JUN 28 2001 Country of Citizenship GREAT BRITAIN

Residence OAK LODGE, HENSTING LANE, FISHERS POND, HAMPSHIRE SO50 7HH, GREAT BRITAIN

Post Office Address AS RESIDENCE ADDRESS

GB3

### Full name of second joint inventor, if any

TIMOTHY  
(Given Name)

~~(Middle Initial or Name)~~

TANNER  
Family (Or Last Name)

Inventor's signature [Signature]

Date JUN 28 2001 Country of Citizenship GREAT BRITAIN

Residence 9 ASPIN WAY, DARBY GREEN, CAMBERLEY, SURREY GU17 0BP, GREAT BRITAIN

Post Office Address AS RESIDENCE ADDRESS

GB3

### Full name of third joint inventor, if any

(Given Name)

(Middle Initial or Name)

Family (Or Last Name)

Inventor's signature \_\_\_\_\_

Date \_\_\_\_\_ Country of Citizenship \_\_\_\_\_

Residence \_\_\_\_\_

Post Office Address \_\_\_\_\_

(check proper box(es) for any of the following added page(s)  
that form a part of this declaration)

☐ **Signature** for fourth and subsequent joint inventors. *Number of pages added* \_\_\_\_\_

\* \* \*

☐ **Signature** by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* \_\_\_\_\_

\* \* \*

☐ **Signature** for inventor who refuses to sign or cannot be reached by person authorized under 37 C.F.R. Section 1.47. *Number of pages added* \_\_\_\_\_

\* \* \*

☐ Added page for **signature** by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time. (37 C.F.R. Section 1.47)

\* \* \*

☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

☐ Number of pages added \_\_\_\_\_

\* \* \*

☐ Authorization of practitioner(s) to accept and follow instructions from representative.

(If no further pages form a part of this Declaration,  
then end this Declaration with this page and check the following item)

☒ This declaration ends with this page.